

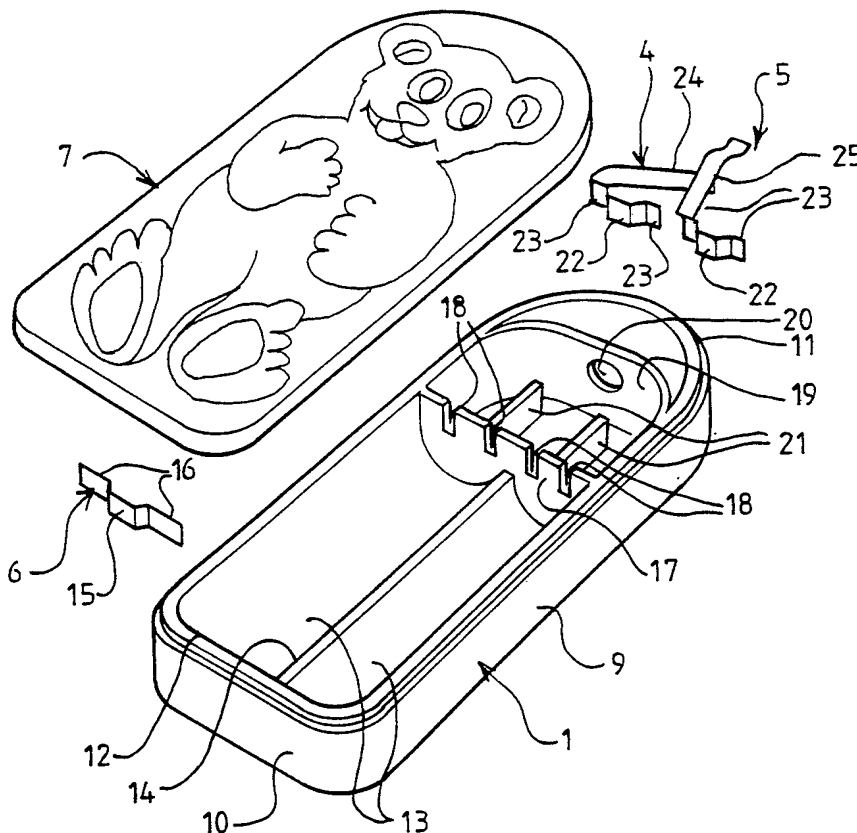


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : F21L 7/00, 15/06	A1	(11) International Publication Number: WO 93/12374 (43) International Publication Date: 24 June 1993 (24.06.93)
(21) International Application Number: PCT/GB92/02261 (22) International Filing Date: 3 December 1992 (03.12.92) (30) Priority data: 9126299.8 9 December 1991 (09.12.91) GB (71) Applicant (for all designated States except US): HI-TECH BATTERIES LIMITED [GB/GB]; Hi-Tech House, Eastman Road, Acton, London W3 7YG (GB). (72) Inventor; and (75) Inventor/Applicant (for US only) : CHU, Cornel [GB/GB]; 33 Campden Hill Road, London W8 7DX (GB). (74) Agent: FRANKLAND, Nigel, Howard; Forrester Ketley & Co., Forrester House, 52 Bounds Green Road, London N11 2EY (GB).		(81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: A TORCH**(57) Abstract**

A torch comprises a housing (1) receiving a bulb (3), a battery (2) and a switch (25) which together form the operative components of the torch. The housing (1) is a substantially rigid, integrally formed component at least part of which adjacent the bulb (3) is transparent or translucent. A cover (7) is mounted upon the housing (1). The cover (7) is also an integrally formed component and has a flexible region (27) which may be depressed to engage and actuate the switch (25) contained within the housing (1). The complete torch is assembled in such a way as to be waterproof.



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A Torch.

THE PRESENT INVENTION relates to a torch and more particularly to a waterproof torch.

It is often necessary to use a torch out of doors, possibly during wet weather conditions. It has therefore been proposed to provide a torch which is waterproof. However, such torches tend to be relatively expensive in view of the difficulty involved in producing a torch which is perfectly watertight.

The present invention seeks to provide a simple and therefore inexpensive waterproof torch.

According to the present invention there is provided a torch comprising a housing receiving a bulb, a battery and a switch which together form the operative components of the torch, the housing being a substantially rigid, integrally formed component at least part of which adjacent the bulb is transparent or translucent, and a cover mounted upon the housing, the cover also being an integrally formed component and having a flexible region which is depressible to engage and actuate the switch contained within the housing, the complete torch being waterproof.

Preferably the cover is permanently mounted upon the housing.

Conveniently the cover is mounted upon the housing by means of an ultrasonic welding technique.

Advantageously the housing is formed from a transparent plastics material.

- 2 -

Preferably the cover is formed from a flexible plastics material.

Conveniently the torch incorporates means for preventing inadvertent actuation of the switch contained within the housing.

Advantageously said means comprise an element formed on the cover for retaining at least part of the cover in a predetermined position such that said switch can only be actuated by pressure applied locally to said flexible region of the cover.

The outer surface of the cover may be three-dimensional, defining an image in relief.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is an exploded, perspective view showing the main components of a torch in accordance with the present invention;

FIGURE 2 is a cross-sectional view of the housing of the torch of Figure 1 showing additional components of the torch in situ;

FIGURE 3 is a cross-sectional view of part of the torch showing a joint between the housing and the cover of the torch; and

- 3 -

FIGURE 4 is a cross-sectional view through the assembled torch.

Referring to Figure 1 of the accompanying drawings a torch in accordance with the present invention comprises a housing 1 to receive batteries 2, a bulb 3 and electrical contacts 4, 5 and 6 and a cover 7 designed to be received upon and close the housing 1.

The housing 1 is an integrally formed substantially rigid plastics component. It is envisaged that the housing will be moulded in a transparent plastics material. The housing 1 is substantially coffin-like in configuration having a base 8 with upstanding walls 9 extending around the periphery of the base. In plan view the housing 1 is substantially rectangular with two opposed, parallel side walls 9, one end wall 10 which extends perpendicularly between the side walls 9 and a second end wall 11 which is arcuate. The walls 9, 10 and 11 present an upper edge 12 upon which the cover 7 is received.

As indicated above the housing 1 serves to accommodate the batteries 2, the bulb 3 and electrical contacts 4, 5 and 6. To this end the interior of the housing defines two arcuate troughs 13 arranged side by side and extending over approximately two thirds of the length of the housing from the end wall 10. The troughs 13 are each dimensioned to accommodate a conventional sized battery. The troughs 13 are separated by a central wall 14 which terminates at a point spaced from the end wall 10, the space between the end wall 10 and the central wall 14 separating the troughs 13 serves to receive the electrical contact 6 which comprises a bent strip of resilient metal. The strip contact 6 is bent in such a way that the contact has a central portion 15 which is snugly received between

- 4 -

the end wall 10 and the wall 14 and forwardly projecting lateral portions 16 which serve to connect the positive terminal of a battery received in one trough 13 with the negative terminal or casing of a battery received in the other trough 13.

At their ends remote from the wall 10 of the housing the troughs 13 are closed off by way of an upstanding wall 17 which extends between the opposed walls 9 of the housing 1. The upper edge of the wall 17 is at the same level as the upper edge 12 of the walls of the housing 1. The upper region of the wall 17 defines four recesses 18 which extend downwardly from the upper edge of the wall, two of the recesses being positioned in alignment with the end of each trough 13 such that the upper region of the wall 17 has a generally castellated appearance.

A further upstanding wall 19 extends between the walls 9 of the housing 1 at a position spaced from the arcuate end wall 11. This wall 19 defines a circular aperture 20 dimensioned to receive part of the glass head of the bulb 3, as is most clearly visible in Figure 2 of the drawings. As with the wall 17, the wall 19 extends up to the level of the upper edge 12 of the walls of the housing 1. Two further walls 21 are located within the housing 1, the two further walls 21 extending parallel to one another between the wall 17 and the wall 19. The walls 21 are of a lesser height than the walls 17, 19 and are spaced apart by a sufficient distance so as to support the main body of the bulb 3 allowing part of the glass head of the bulb to enter the aperture 20.

The recesses 18 formed in the upper edge of the wall 17 serve to receive the electrical contacts 4 and 5 which, like the electrical contact 6, are formed from bent

- 5 -

strips of resilient metal. Both the electrical contacts 4 and 5 have a region which is the same general configuration as the electrical contact 6 i.e. each contact 4, 5 has a region defining a recessed central portions 22 and a pair of forwardly projecting lateral portion 23. In addition the electrical contact 4 carries a forwardly projecting arm 24 on one lateral portion 23, whilst the contact 5 carries an upwardly and forwardly extending arm 25 on one of its lateral portions 23. The contacts 4, 5 are mounted upon the wall 17 such that the recessed central portion 22 is on that side of the wall 17 which faces the troughs 13 so that the recessed central portion 22 of each contact 4, 5 can engage the positive or negative terminal of a battery received in each trough 13. The forwardly projecting arm 24 of the contact 4 extends so as to engage the terminal on the base of the bulb 3 when the bulb is received upon the walls 21 with part of its glass head extending into the aperture 20. The resilience of the material from which the contact 4 is formed serves to retain the bulb in position with the end of the glass head in the aperture 20. The free end of the forwardly and upwardly extending arm 25 on the contact 5 is positioned adjacent but not touching the side of the bulb 3 which constitutes the second terminal of the bulb. The free end of the arm 25 may be moved into engagement with the bulb so as to establish a complete electrical circuit and light the bulb, as will be explained below.

The cover 7 is formed from a relatively soft plastics material as an integrally moulded component. In plan view the cover corresponds, of course, in size and shape to the housing 1. As explained above the cover 7 is designed to be mounted upon the upper edge 12 of the walls of the housing 1 and for this purpose the cover 7 carries a small downwardly directed lip 26 around its periphery.

SUBSTITUTE SHEET

- 6 -

As can be seen most clearly in Figure 3 of the drawings the upper edge 12 of the walls of the housing 1 and the lower edge of the lip 26 around the periphery of the cover 7 are both of stepped configuration to facilitate assembly of the torch.

The torch is assembled by inserting the batteries 2, bulb 3 and electrical contacts 4, 5 and 6 into the housing 1 in the manner as explained above. The cover 7 is then positioned upon the upper edge 12 of the walls of the housing and is ultrasonically welded in position. When the cover is located upon the upper edge of the housing a region of the underside of the cover 7 will lie immediately adjacent the upstanding arm 25 on the electrical contact 5, as is most clearly visible in Figure 4 of the drawings. This region of the cover is identified by reference numeral 27 in Figure 4 of the drawings. Applying pressure to the region 27 of the cover will cause the arm 25 of the electrical contact 5 to move into engagement with the bulb casing thereby completing an electrical circuit and lighting the bulb 3. If the housing 1 is formed from a transparent plastics material then light from the bulb 3 will pass through the housing 1. It is to be appreciated that it would be possible for only that portion of the housing 1 which is adjacent the bulb 3 to be transparent or translucent and for the remainder of the housing 1 to be substantially opaque.

Whilst not essential, the cover 7 in the specific embodiment illustrated in the drawings is three-dimensional, defining the shape of an animal on its upper surface. It is envisaged that the upper surface of the cover 7 may define cartoon characters or other such figures which will appeal to young children.

- 7 -

A rib 28 is provided on the underside of the cover which engages the upwardly directed surfaces of the batteries 2. The rib 28 is located beneath the highest point 29 of the cover and extends transversely across the cover. The provision of this rib helps to prevent accidental switching on of the torch, since the rib maintains the cover at a position spaced from the batteries 2 and thereby ensures that the torch can only be switched on by localized pressure applied to the region 27 which is sufficiently flexible to be depressed and move the arm 25 of the contact 5 into engagement with the bulb 3.

It will be appreciated that the ultrasonic welding of the cover onto the housing forms a hermetic seal so that the torch is fully waterproof. In alternative arrangements other techniques may be used to mount the cover on the housing in a watertight manner, such as solvent welding or using hot melt adhesives. Various modifications may, of course, be made to the described embodiment without departing from the scope of the present invention.

- 8 -

CLAIMS

1. A torch comprising a housing receiving a bulb, a battery and a switch which together form the operative components of the torch, the housing being a substantially rigid, integrally formed component at least part of which adjacent the bulb is transparent or translucent, and a cover mounted upon the housing, the cover also being an integrally formed component and having a flexible region which is depressible to engage and actuate the switch contained within the housing, the complete torch being waterproof.

2. A torch according to Claim 1 wherein the cover is permanently mounted upon the housing.

3. A torch according to Claim 2 wherein the cover is mounted upon the housing by means of an ultrasonic welding technique.

4. A torch according to any one of Claims 1 to 3 wherein the housing is formed from a transparent plastics material.

5. A torch according to any one of Claims 1 to 4 wherein the cover is formed from a flexible plastics material.

6. A torch according to Claim 5 wherein the torch incorporates means for preventing inadvertent actuation of the switch contained within the housing.

7. A torch according to Claim 6 wherein said means comprise an element formed on the cover for retaining at least part of the cover in a predetermined position such

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- 9 -

that said switch can only be actuated by pressure applied locally to said flexible region of the cover.

8. A torch according to any one of Claims 1 to 7 wherein the outer surface of the cover is three-dimensional, defining an image in relief.

9. A torch substantially as herein described, with reference to and as shown in the accompanying drawings.

10. Any novel feature or combination of features disclosed herein.

1 / 2

FIG 1

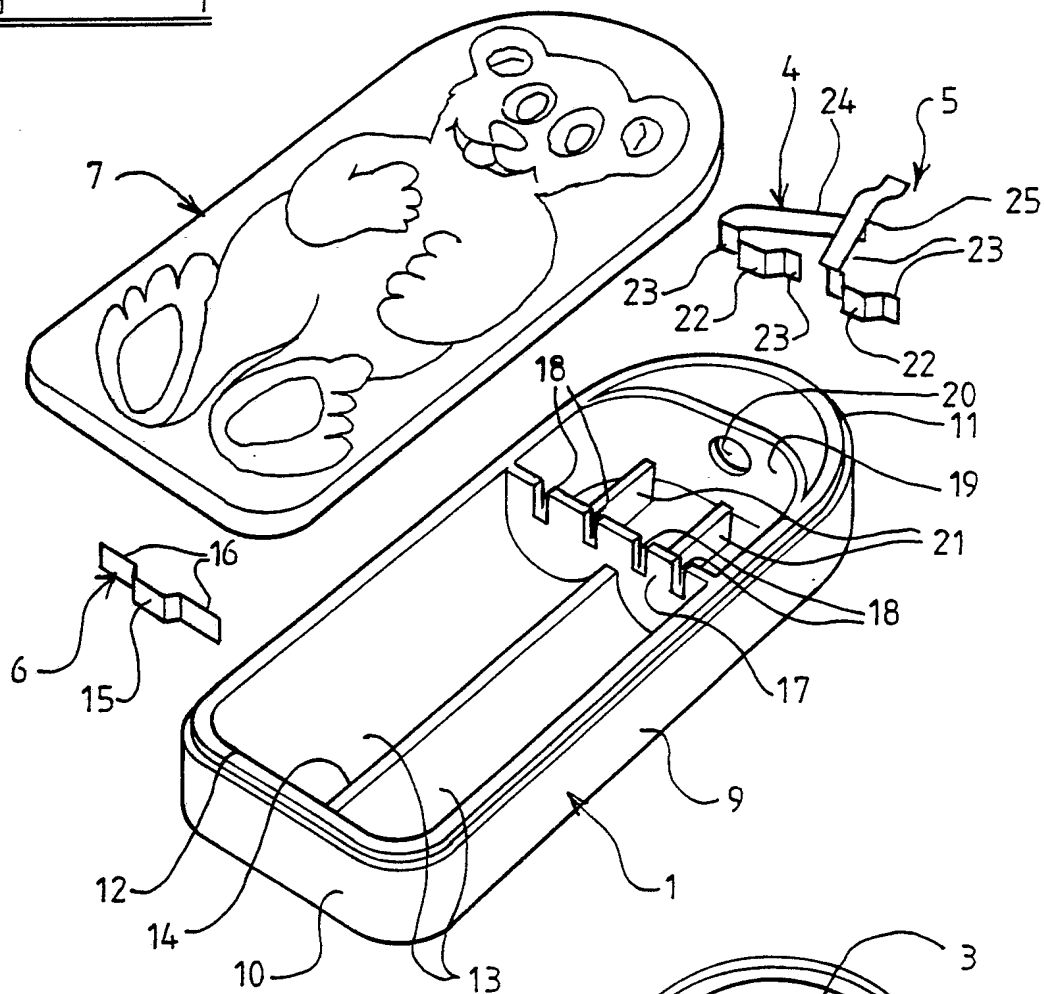
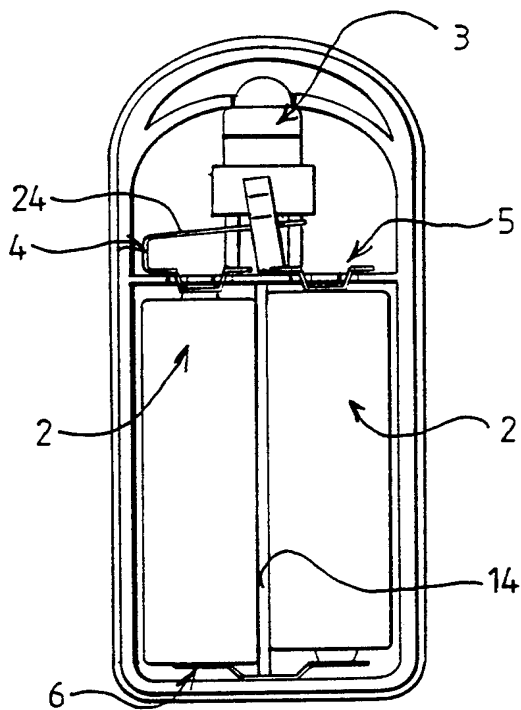
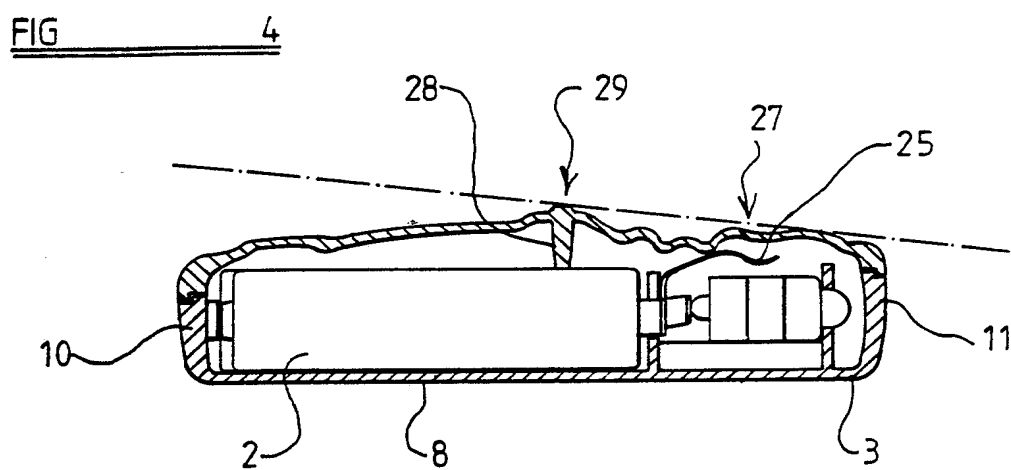
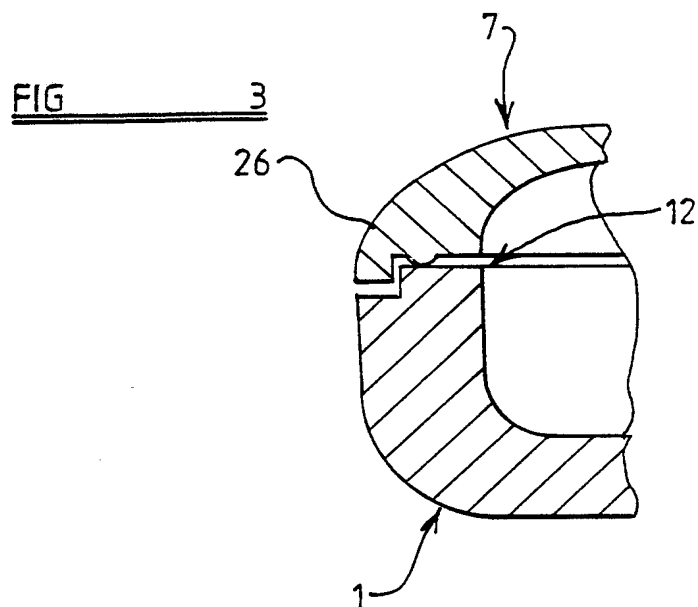


FIG 2



2 / 2



INTERNATIONAL SEARCH REPORT

PCT/GB 92/02261

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)⁶

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 F21L7/00; F21L15/06

II. FIELDS SEARCHEDMinimum Documentation Searched⁷

Classification System

Classification Symbols

Int.Cl. 5

F21L

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched⁸**III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹**

Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	EP,A,0 271 350 (EVEREADY BATTERY COMPANY, INC.) 15 June 1988 see column 4, line 19 - line 32 see column 7, line 25 - line 56 see column 8, line 13 - line 15; figures 1A-5 ---	1-4,6,7
Y	DE,C,832 169 (MÖLLER) 24 January 1952 see claims 1, 16; figure ---	1-4,6,7
A	WO,A,8 505 432 (THE COMMONWEALTH OF AUSTRALIA) 5 December 1985 see page 3, line 12 - page 4, line 30 see page 6, line 6 - line 13; figures 1,2 --- -/-	1,2,5

¹⁰ Special categories of cited documents:

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IV. CERTIFICATION

Date of the Actual Completion of the International Search

02 APRIL 1993

Date of Mailing of this International Search Report

23. 04. 93

International Searching Authority

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MARTIN C.P.A.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	DE,U,8 813 744 (BIG-SPIELWARENFABRIK) 22 December 1988 see page 7, line 20 - page 8, line 29; figures 1-3 ----	1,4,8
A	US,A,4 237 527 (BREEDLOVE) 2 December 1980 see abstract see column 1, line 33 - line 67; figures 1-4 -----	1

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

GB 9202261
SA 67354

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
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02/04/93

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WO-A-8505432	05-12-85	AU-A- 4350185 EP-A- 0181890	13-12-85 28-05-86
DE-U-8813744	22-12-88	None	
US-A-4237527	02-12-80	None	